

### Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	4.000
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	3.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

### Circular Default Sewer Type Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

### Available Diameters (mm)

100 | 150

### Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
AS1	0.031	3.00	59.683	1200	509124.507	154484.398	1.233
AS2	0.006	3.00	59.803	1200	509117.273	154477.565	1.412
AS3	0.017	3.00	60.051	1200	509097.637	154468.002	1.788
1	0.027	3.00	59.750	450	509139.915	154492.926	0.750
2	0.016	3.00	59.900	450	509122.396	154475.525	1.065
3	0.016	3.00	59.750	450	509105.479	154454.623	1.095
AS4			60.000	1350	509097.614	154461.376	1.826
AS54	0.021	3.00	59.900	1500	509081.672	154455.350	1.802
AS55			59.500	1200	509074.346	154444.186	1.491
AS56			59.500	1200	509075.215	154433.117	1.565
HW1			59.500		509073.169	154431.349	1.583

### Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	AS1	AS2	9.951	0.600	58.450	58.391	0.059	170.0	225	3.17	50.0
1.001	AS2	AS3	21.841	0.600	58.391	58.263	0.128	170.0	225	3.53	50.0
1.002	AS3	AS4	6.626	0.600	58.263	58.174	0.089	74.4	225	3.60	50.0
2.000	1	2	24.692	0.600	59.000	58.835	0.165	150.0	150	3.50	50.0
2.001	2	3	26.890	0.600	58.835	58.655	0.180	149.6	150	4.05	50.0
2.002	3	AS4	10.366	0.600	58.665	58.249	0.416	24.9	150	4.14	50.0
1.003	AS4	AS54	17.043	0.600	58.174	58.098	0.076	225.3	225	4.46	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.000	39.7	4.2	1.008	1.187	0.031	0.0
1.001	1.000	39.7	5.0	1.187	1.563	0.037	0.0
1.002	1.517	60.3	7.3	1.563	1.601	0.054	0.0
2.000	0.818	14.5	3.7	0.600	0.915	0.027	0.0
2.001	0.819	14.5	5.8	0.915	0.945	0.043	0.0
2.002	2.025	35.8	8.0	0.935	1.601	0.059	0.0
1.003	0.867	34.5	15.3	1.601	1.577	0.113	0.0

### Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.004	AS54	AS55	13.353	0.600	58.098	58.009	0.089	150.0	150	4.74	50.0
1.005	AS55	AS56	11.103	0.600	58.009	57.935	0.074	150.0	150	4.96	50.0
1.006	AS56	HW1	2.704	0.600	57.935	57.917	0.018	150.0	150	5.02	50.0



Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.004	0.818	14.5	18.2	1.652	1.341	0.134	0.0
1.005	0.818	14.5	18.2	1.341	1.415	0.134	0.0
1.006	0.818	14.5	18.2	1.415	1.433	0.134	0.0

### Pipeline Schedule








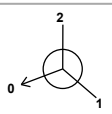









Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	9.951	170.0	225	Circular_Default Sewer Type	59.683	58.450	1.008	59.803	58.391	1.187
1.001	21.841	170.0	225	Circular_Default Sewer Type	59.803	58.391	1.187	60.051	58.263	1.563
1.002	6.626	74.4	225	Circular_Default Sewer Type	60.051	58.263	1.563	60.000	58.174	1.601
2.000	24.692	150.0	150	Circular_Default Sewer Type	59.750	59.000	0.600	59.900	58.835	0.915
2.001	26.890	149.6	150	Circular_Default Sewer Type	59.900	58.835	0.915	59.750	58.655	0.945
2.002	10.366	24.9	150	Circular_Default Sewer Type	59.750	58.665	0.935	60.000	58.249	1.601
1.003	17.043	225.3	225	Circular_Default Sewer Type	60.000	58.174	1.601	59.900	58.098	1.577
1.004	13.353	150.0	150	Circular_Default Sewer Type	59.900	58.098	1.652	59.500	58.009	1.341
1.005	11.103	150.0	150	Circular_Default Sewer Type	59.500	58.009	1.341	59.500	57.935	1.415
1.006	2.704	150.0	150	Circular_Default Sewer Type	59.500	57.935	1.415	59.500	57.917	1.433

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	AS1	1200	Manhole	Adoptable	AS2	1200	Manhole	Adoptable
1.001	AS2	1200	Manhole	Adoptable	AS3	1200	Manhole	Adoptable
1.002	AS3	1200	Manhole	Adoptable	AS4	1350	Manhole	Adoptable
2.000	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable
2.001	2	450	Manhole	Adoptable	3	450	Manhole	Adoptable
2.002	3	450	Manhole	Adoptable	AS4	1350	Manhole	Adoptable
1.003	AS4	1350	Manhole	Adoptable	AS54	1500	Manhole	Adoptable
1.004	AS54	1500	Manhole	Adoptable	AS55	1200	Manhole	Adoptable
1.005	AS55	1200	Manhole	Adoptable	AS56	1200	Manhole	Adoptable
1.006	AS56	1200	Manhole	Adoptable	HW1		Junction	

### Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
AS1	509124.507	154484.398	59.683	1.233	1200		0	1.000	58.450	225
AS2	509117.273	154477.565	59.803	1.412	1200		1	1.000	58.391	225
							0	1.001	58.391	225

### Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
AS3	509097.637	154468.002	60.051	1.788	1200	 1	1.001	58.263	225	
						 0	1.002	58.263	225	
1	509139.915	154492.926	59.750	0.750	450	 0	2.000	59.000	150	
2	509122.396	154475.525	59.900	1.065	450	 1	2.000	58.835	150	
						 0	2.001	58.835	150	
3	509105.479	154454.623	59.750	1.095	450	 1	2.001	58.655	150	
						 0	2.002	58.665	150	
AS4	509097.614	154461.376	60.000	1.826	1350	 2 1 0	2.002	58.249	150	
						 2	1.002	58.174	225	
						 1	0	1.003	58.174	225
AS54	509081.672	154455.350	59.900	1.802	1500	 1	1.003	58.098	225	
						 0	1.004	58.098	150	
AS55	509074.346	154444.186	59.500	1.491	1200	 1	1.004	58.009	150	
						 0	1.005	58.009	150	
AS56	509075.215	154433.117	59.500	1.565	1200	 1	1.005	57.935	150	
						 0	1.006	57.935	150	
HW1	509073.169	154431.349	59.500	1.583		 1	1.006	57.917	150	

### Simulation Settings

Rainfall Methodology	FEH-13	Skip Steady State	✓	Check Discharge Volume	✓
Summer CV	0.740	Drain Down Time (mins)	240	100 year 360 minute (m <sup>3</sup> )	
Winter CV	0.840	Additional Storage (m <sup>3</sup> /ha)	20.0		
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

### Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	6	0

### Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

### Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m <sup>3</sup> )	

### Node HW1 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m <sup>2</sup> )	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.250	300	1.250	600	1.250	900	1.250	1200	1.250
60	1.250	360	1.250	660	1.250	960	1.250	1260	1.250
120	1.250	420	1.250	720	1.250	1020	1.250	1320	1.250
180	1.250	480	1.250	780	1.250	1080	1.250	1380	1.250
240	1.250	540	1.250	840	1.250	1140	1.250	1440	1.250

### Node AS54 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	58.098	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

### Node AS4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	58.174
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	55.0	0.0	0.400	55.0	0.0	0.800	55.0	0.0	0.801	0.0	0.0

### Node AS4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	59.050	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	435	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.30	Length (m)	9.500		

**Node 1 Carpark Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	59.150	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	315	Depth (m)	0.350
Safety Factor	2.0	Width (m)	7.000	Inf Depth (m)	
Porosity	0.30	Length (m)	19.300		

**Node AS54 Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	58.098
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	45.0	0.0	0.800	45.0	0.0	0.801	0.0	0.0

**Other (defaults)**

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.09%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	AS1	9	58.506	0.056	5.1	0.0918	0.0000	OK
960 minute winter	AS2	930	58.473	0.082	0.5	0.0998	0.0000	OK
960 minute winter	AS3	930	58.473	0.210	1.5	0.2775	0.0000	OK
15 minute summer	1	9	59.055	0.055	4.4	0.0485	0.0000	OK
15 minute summer	2	10	58.908	0.073	6.8	0.0335	0.0000	OK
15 minute summer	3	10	58.719	0.064	8.9	0.0288	0.0000	OK
960 minute winter	AS4	930	58.473	0.299	2.9	16.0532	0.0000	SURCHARGED
960 minute winter	AS54	930	58.473	0.375	0.9	16.7832	0.0000	SURCHARGED
960 minute winter	AS55	930	58.473	0.464	0.2	0.5245	0.0000	SURCHARGED
960 minute winter	AS56	930	58.473	0.538	0.1	0.6082	0.0000	SURCHARGED
15 minute summer	HW1	1	59.167	1.250	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	AS1	1.000	AS2	4.9	0.620	0.124	0.0788	
960 minute winter	AS2	1.001	AS3	0.5	0.350	0.013	0.5644	
960 minute winter	AS3	1.002	AS4	2.2	0.493	0.037	0.2597	
15 minute summer	1	2.000	2	4.2	0.597	0.290	0.1741	
15 minute summer	2	2.001	3	6.6	0.840	0.453	0.2100	
15 minute summer	3	2.002	AS4	9.0	1.630	0.250	0.0570	
960 minute winter	AS4	1.003	AS54	0.7	0.325	0.019	0.6778	
960 minute winter	AS54	Hydro-Brake®	AS55	0.2				
960 minute winter	AS55	1.005	AS56	0.1	0.069	0.005	0.1955	
960 minute winter	AS56	1.006	HW1	0.0	0.000	0.000	0.0476	0.0

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.09%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
1440 minute winter	AS1	1440	58.992	0.542	0.6	0.8852	0.0000	SURCHARGED
1440 minute winter	AS2	1440	58.992	0.601	0.6	0.7304	0.0000	SURCHARGED
1440 minute winter	AS3	1440	58.992	0.729	0.9	0.9626	0.0000	SURCHARGED
15 minute summer	1	10	59.127	0.127	12.5	0.1118	0.0000	OK
15 minute summer	2	10	59.044	0.209	19.0	0.0962	0.0000	SURCHARGED
1440 minute winter	3	1440	58.992	0.337	1.1	0.1518	0.0000	SURCHARGED
1440 minute winter	AS4	1440	58.992	0.818	2.3	42.9962	0.0000	SURCHARGED
1440 minute winter	AS54	1440	58.992	0.894	1.1	36.0085	0.0000	SURCHARGED
1440 minute winter	AS55	1440	58.991	0.982	0.1	1.1104	0.0000	SURCHARGED
1440 minute winter	AS56	1440	58.991	1.056	0.1	1.1941	0.0000	SURCHARGED
15 minute summer	HW1	1	59.167	1.250	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
1440 minute winter	AS1	1.000	AS2	0.5	0.326	0.014	0.3958	
1440 minute winter	AS2	1.001	AS3	0.6	0.262	0.015	0.8686	
1440 minute winter	AS3	1.002	AS4	1.6	0.492	0.026	0.2635	
15 minute summer	1	2.000	2	11.6	0.741	0.804	0.4140	
15 minute summer	2	2.001	3	17.1	1.013	1.179	0.4203	
1440 minute winter	3	2.002	AS4	1.1	0.662	0.031	0.1825	
1440 minute winter	AS4	1.003	AS54	0.7	0.259	0.020	0.6778	
1440 minute winter	AS54	Hydro-Brake <sup>®</sup>	AS55	0.1				
1440 minute winter	AS55	1.005	AS56	0.1	0.042	0.008	0.1955	
1440 minute winter	AS56	1.006	HW1	0.0	0.000	0.000	0.0476	0.0

**Results for 100 year +40% CC +6% A Critical Storm Duration. Lowest mass balance: 99.09%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
960 minute winter	AS1	705	59.583	1.133	1.6	1.8857	0.0000	FLOOD RISK
960 minute winter	AS2	705	59.583	1.192	1.8	1.4557	0.0000	FLOOD RISK
960 minute winter	AS3	705	59.583	1.320	2.6	1.7599	0.0000	SURCHARGED
960 minute winter	1	705	59.584	0.584	2.7	13.9558	0.0000	FLOOD RISK
960 minute winter	2	705	59.584	0.749	2.2	0.3579	0.0000	SURCHARGED
960 minute winter	3	705	59.583	0.928	3.0	0.4354	0.0000	FLOOD RISK
960 minute winter	AS4	705	59.583	1.409	5.4	53.1504	0.0000	SURCHARGED
960 minute winter	AS54	705	59.583	1.485	3.0	37.2121	0.0000	SURCHARGED
720 minute winter	AS55	510	59.169	1.160	2.0	1.3123	0.0000	SURCHARGED
720 minute winter	AS56	510	59.168	1.233	2.0	1.3940	0.0000	SURCHARGED
15 minute summer	HW1	1	59.167	1.250	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
960 minute winter	AS1	1.000	AS2	1.5	0.366	0.038	0.3958	
960 minute winter	AS2	1.001	AS3	1.7	0.350	0.043	0.8686	
960 minute winter	AS3	1.002	AS4	2.5	0.551	0.042	0.2635	
960 minute winter	1	2.000	2	-1.5	0.442	-0.103	0.4347	
960 minute winter	2	2.001	3	2.2	0.558	0.151	0.4734	
960 minute winter	3	2.002	AS4	2.9	0.791	0.080	0.1825	
960 minute winter	AS4	1.003	AS54	1.9	0.372	0.056	0.6778	
960 minute winter	AS54	Hydro-Brake®	AS55	2.0				
720 minute winter	AS55	1.005	AS56	2.0	0.140	0.135	0.1955	
720 minute winter	AS56	1.006	HW1	2.0	0.111	0.135	0.0476	51.2